KTH ROYAL INSTITUTE
OF TECHNOLOGY

Importance of electrochemical and surface characteristics of a range of metal nanoparticles for environmental fate

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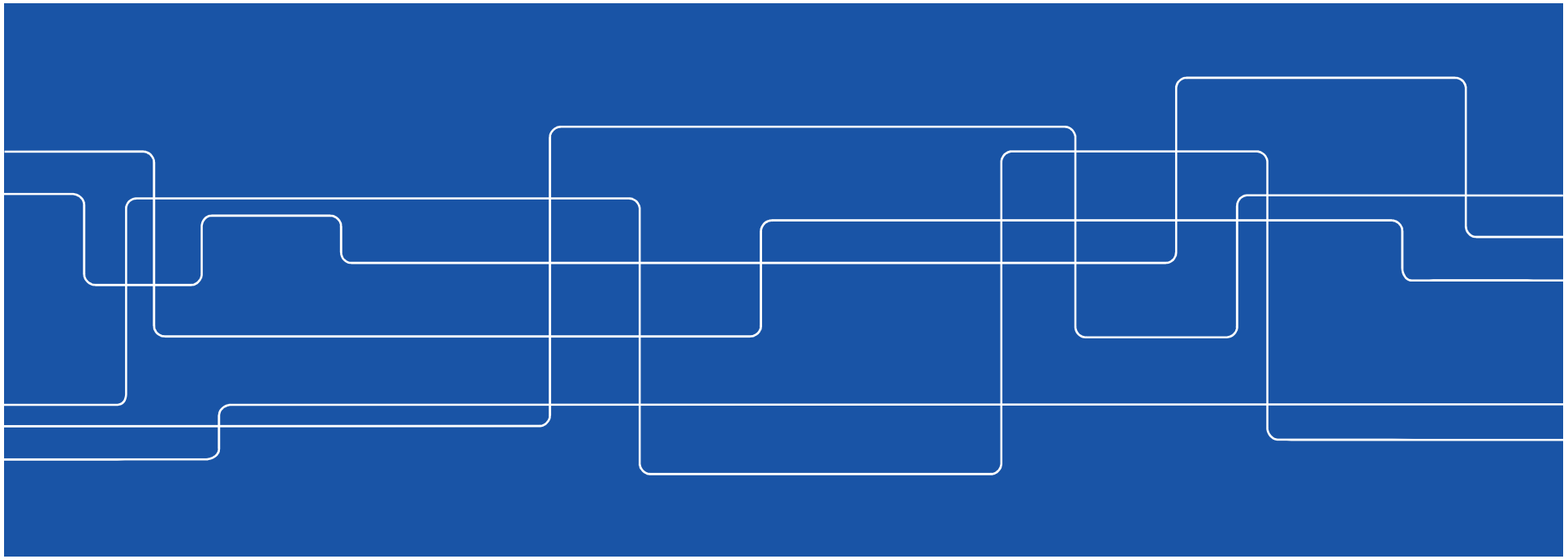
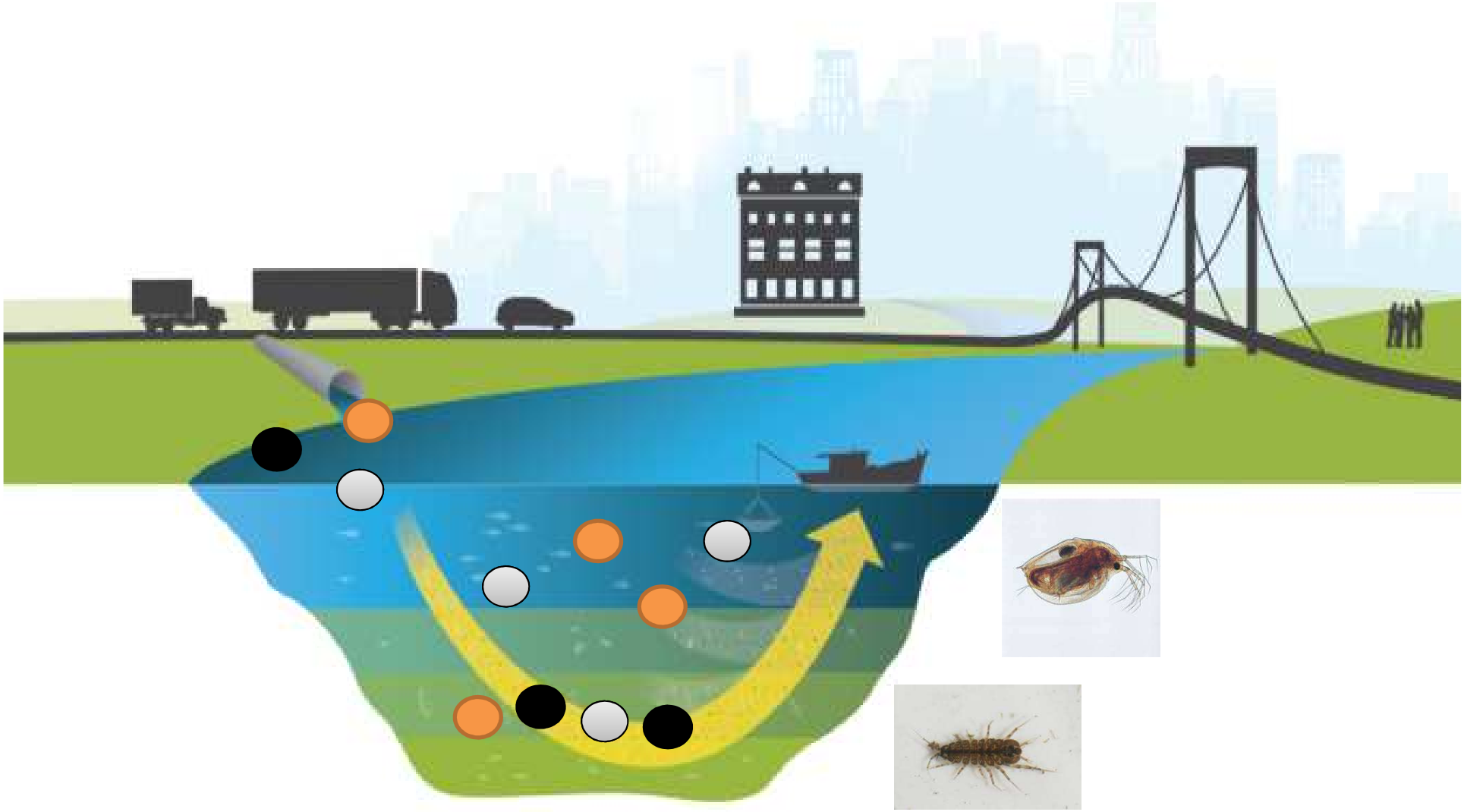
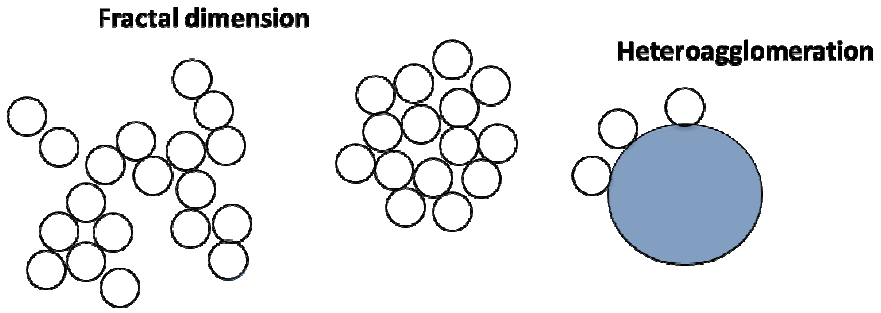


Environmental transformations of metal nanoparticles



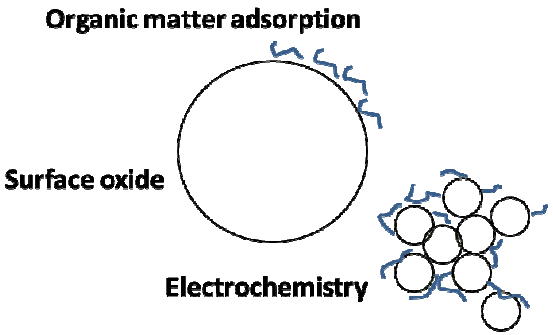


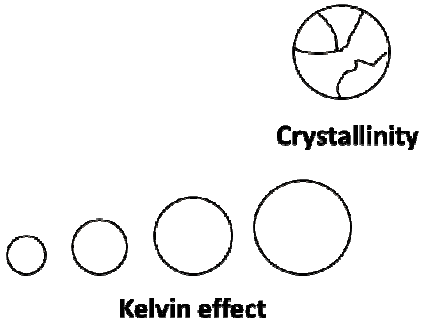
Aggregation and Agglomeration

Nanoparticle dissolution

Surface reactions and properties

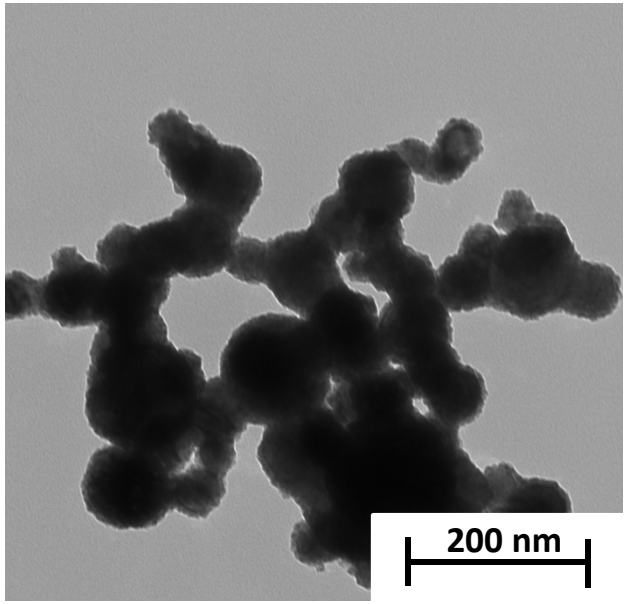
Nanoparticle size and shape

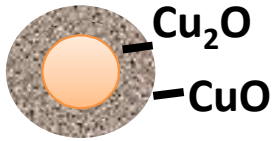




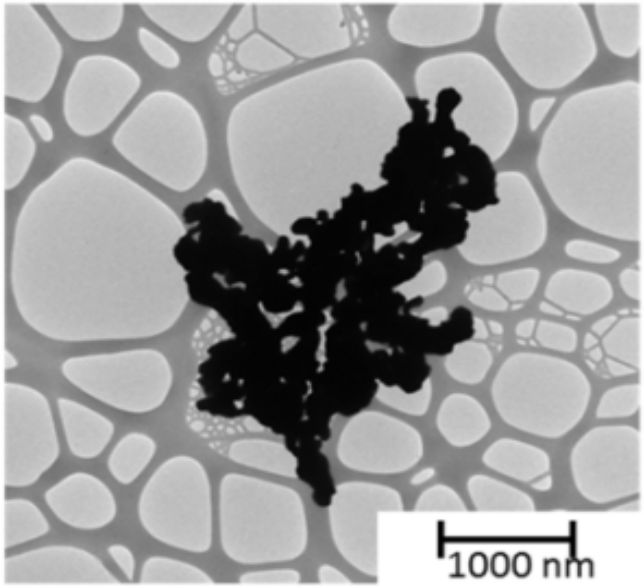
Size, shape, and surface oxide of studied nanoparticles

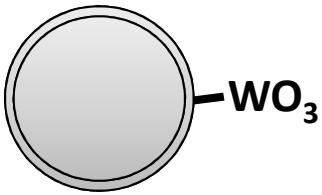
Cu





WC

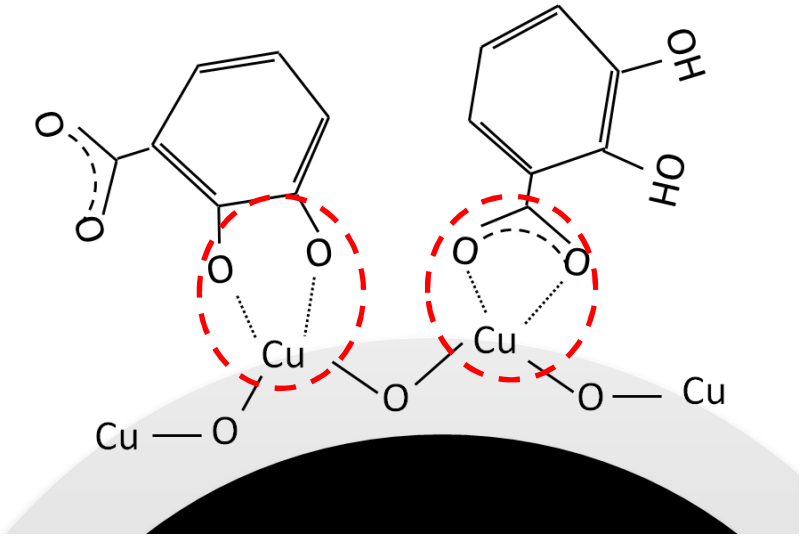




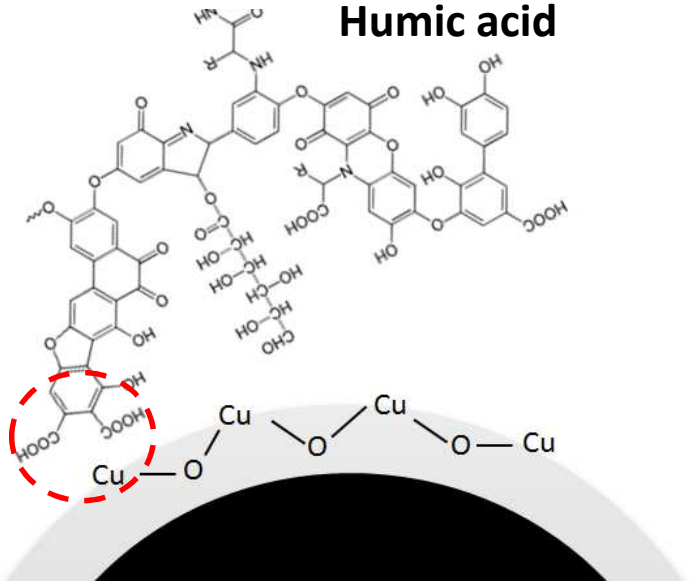
Hedberg, Y.S., Hedberg, J.F., Isaksson, S., Mei, N., Blomberg, E., Wold, S. and Odnevall Wallinder, I., 2017. Environmental pollution, 224, pp.275-288.

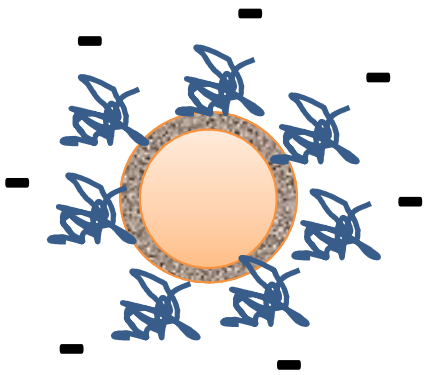
Adsorption of natural organic matter on copper nanoparticles

Dihydroxybenzoic acid (DHBA)



Humic acid

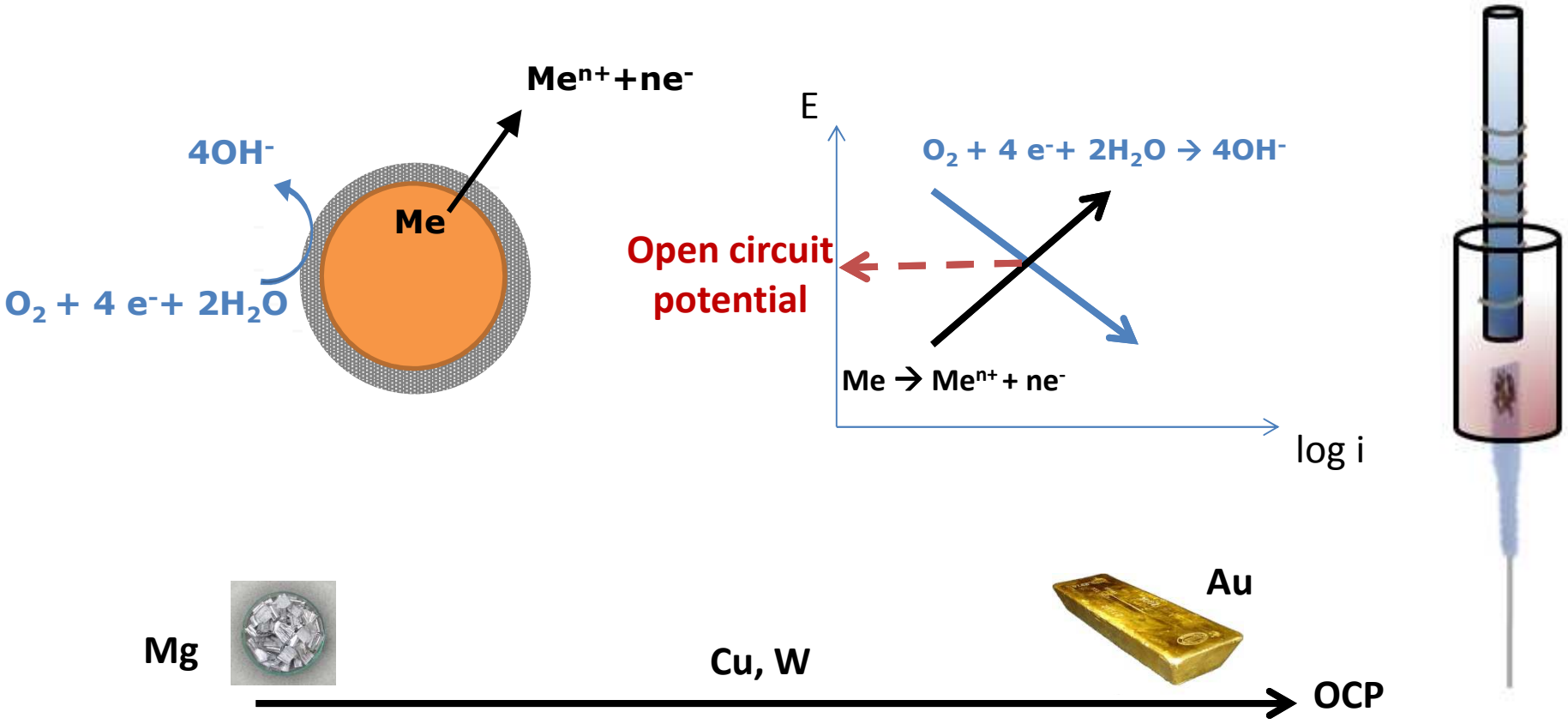




- **Detection of adsorbed species through IR spectroscopy**
- **Increase negative charge and colloidal stabilization with adsorbed humic cid**

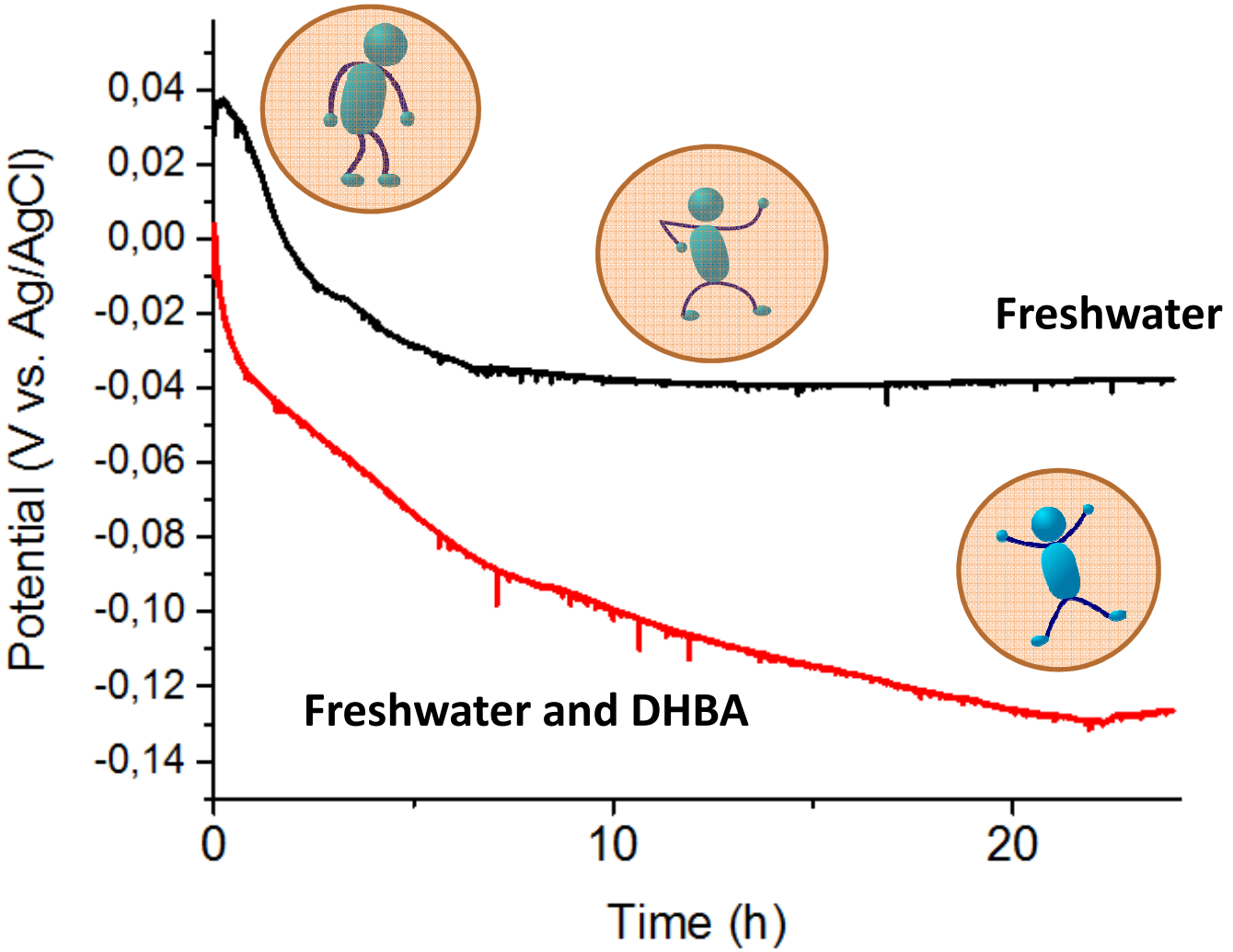
Pradhan, S., Hedberg, J., Rosenqvist, J., Jonsson, C.M., Wold, S., Blomberg, E. and Odnevall Wallinder, I., 2018. PloS one, 13(2), p.e0192553.

Open circuit potential (OCP) of studied metal nanoparticles is influenced by adsorption of natural organic matter



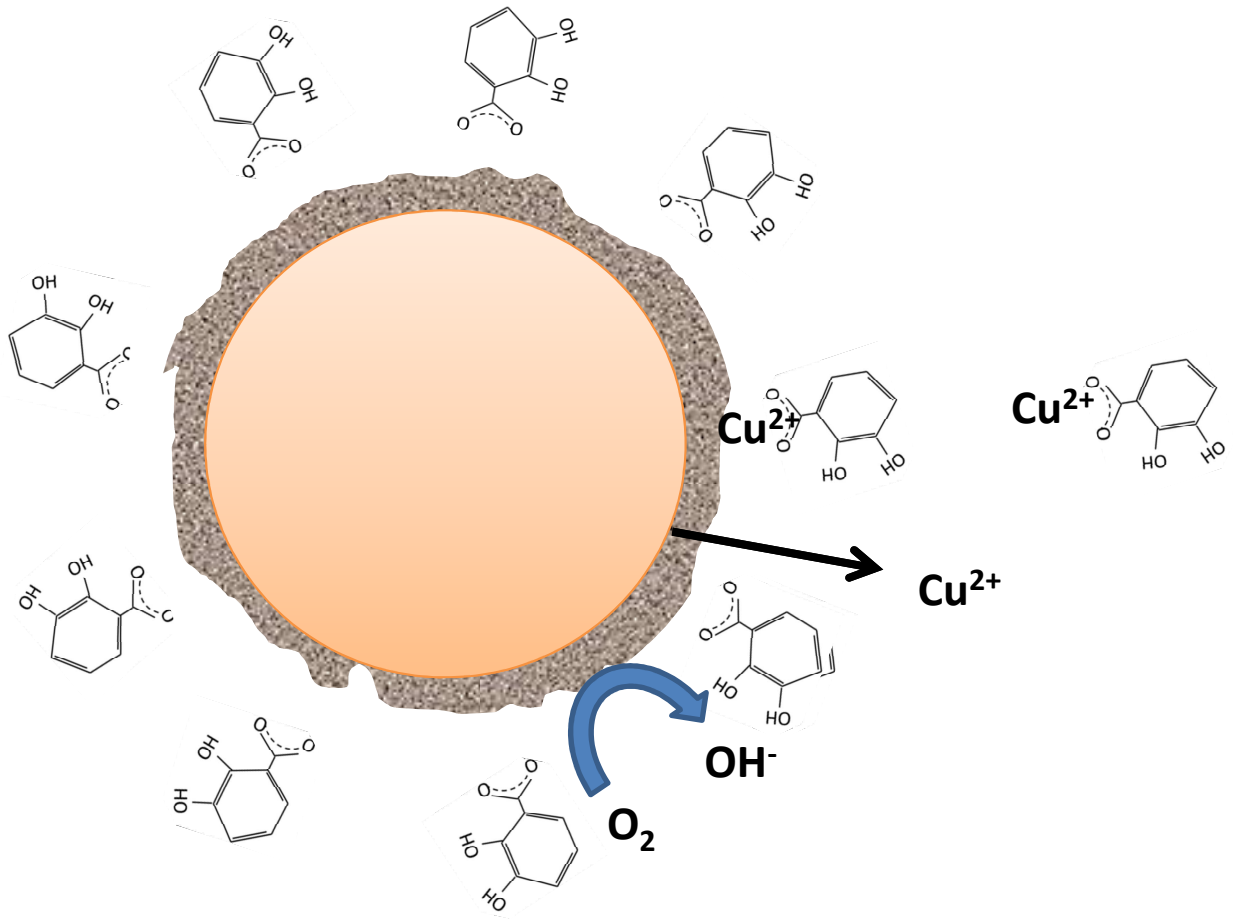
Hedberg, Y.S., Hedberg, J.F., Isaksson, S., Mei, N., Blomberg, E., Wold, S. and Odnevall Wallinder, I., 2017.. Environmental pollution, 224, pp.275-288.

Evolution of open circuit potential of copper nanoparticles



Hedberg, Y.S., Hedberg, J.F., Isaksson, S., Mei, N., Blomberg, E., Wold, S. and Odnevall Wallinder, I., 2017.. Environmental pollution, 224, pp.275-288.

Dissolution of copper nanoparticles assisted by adsorption-enhanced corrosion



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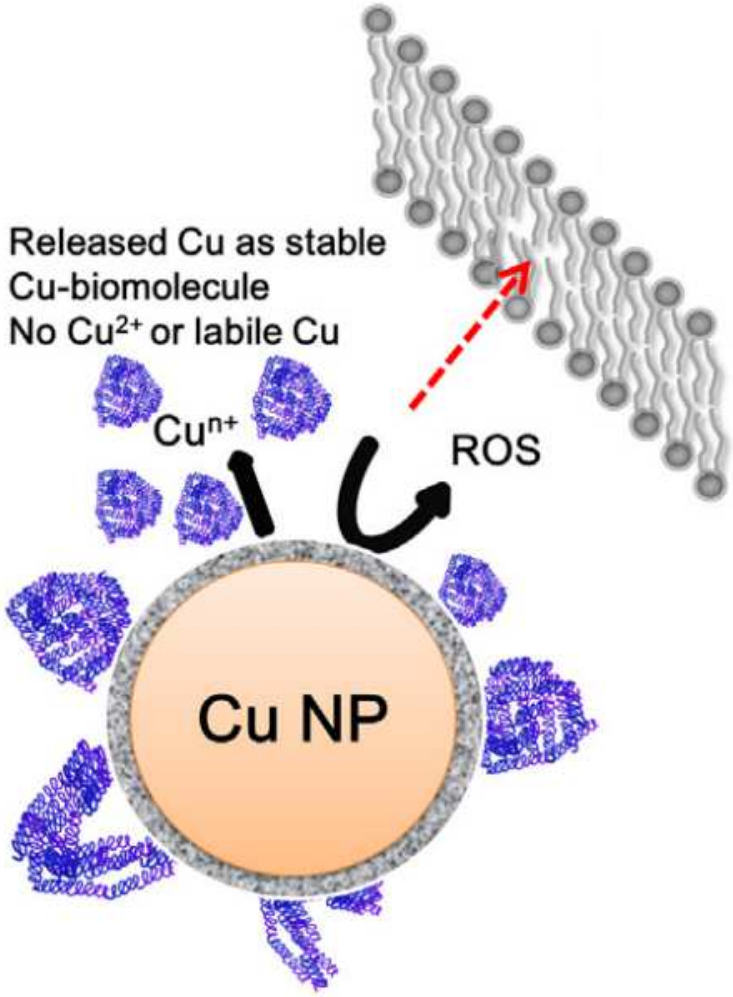
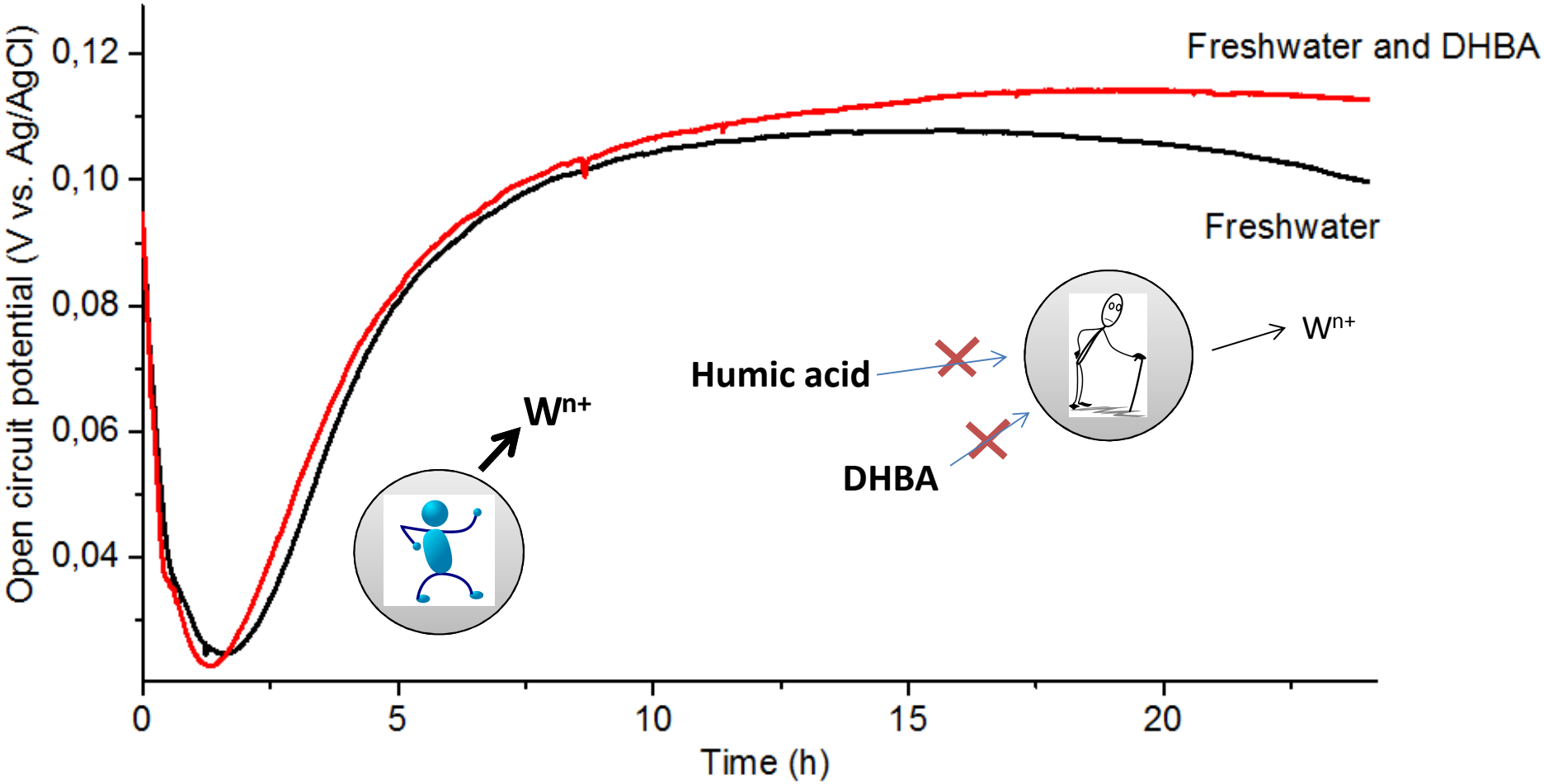
Reactive oxygen species from corrosion reactions important for cell membrane damage



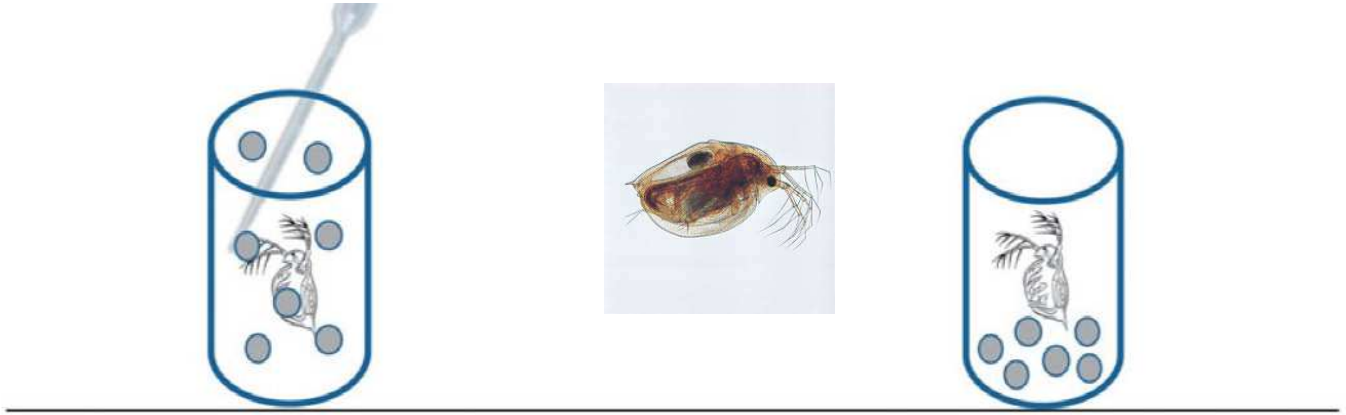
Hedberg, J., Karlsson, H.L., Hedberg, Y., Blomberg, E. and Odnevall Wallinder, I., 2016. *Colloids and Surfaces B: Biointerfaces*, *141*, pp.291-300.

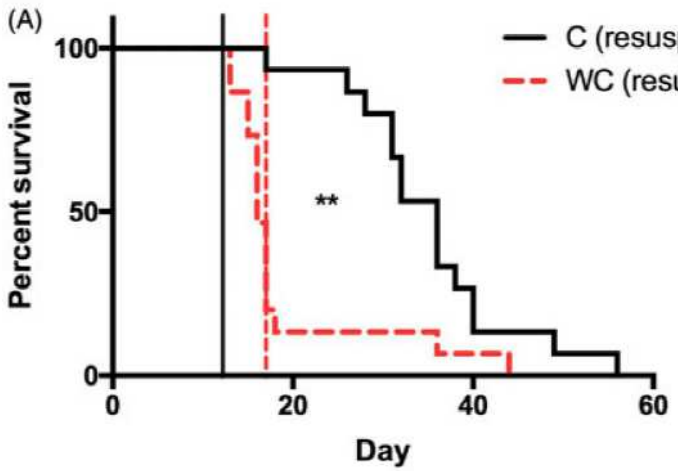
Open circuit potential of tungsten carbide nanoparticles

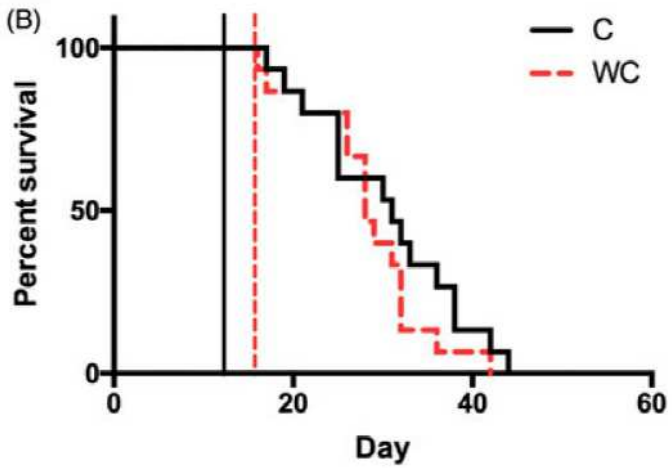


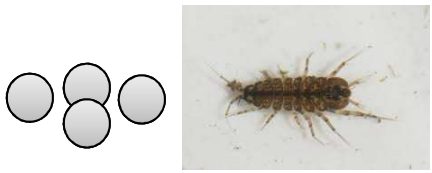
Hedberg, Y.S., Hedberg, J.F., Isaksson, S., Mei, N., Blomberg, E., Wold, S. and Odnevall Wallinder, I., 2017.. Environmental pollution, 224, pp.275-288.

Sedimentation decreases toxicity for *Daphnia;* bottom feeder *Asellus* unaffected









Ekvall, M. T., Hedberg, J., Odnevall Wallinder, I., Hansson, L. A., & Cedervall, T. (2018). Nanotoxicology, 12(1), 79-89.

Summary

- **Natural organic matter influence electrochemical properties of copper nanoparticles**

- **Tungsten carbide nanoparticles unaffected by natural organic matter. Oxide stability leads to slow dissolution in environment.**

Acknowledgements

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Hanna Karlsson

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The Swedish Foundation for Strategic Environmental Research

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